Listing of Claims

1-34 (Cancelled).

35. (New) A method for decreasing the expression of PSD-95 protein in a cell, the method comprising contacting the cell with an agent that inhibits the interaction of Nrg-1 with Eos, the inhibition of interaction resulting in a decrease in PSD-95 promoter activity in the cell.

36. (New) The method of claim 35, wherein the agent is a nucleotide sequence encoding a polypeptide that blocks interaction between Nrg-1 and Eos.

37. (New) The method of claim 36, wherein the nucleotide sequence encodes a polypeptide having the amino acid sequence of SEQ ID NO. 8.

38. (New) The method of claim 35, wherein the cell is a mammalian cell.

39. (New) The method of claim 38, wherein the cell is a neuron.

40. (New) A method for identifying a compound that modulates the Nrg-1/Eos signaling pathway in a cell, the method comprising:

(a) combining one or more test compounds with at least one or more agents that participate in the pathway;

(b) determining the amount of PSD-95 protein expressed in the cell in the presence of the test compound; and

(c) comparing the amount of PSD-95 protein expressed in the cell in the presence of the test compound with the amount of PSD-95 protein expressed in the cell in the absence of the test compound, wherein a change in the amount of PSD-95 expression in the presence of the test compound is indicative of a compound that modulates the pathway.

41. (New) The method of claim 40, wherein the agent that participates in the signaling pathway is a nucleotide sequence encoding Nrg-ICD or a portion thereof, the nucleotide sequence hybridizing to a nucleotide sequence having SEQ ID. No:1 in 5x SSC at 42° C.

42. (New) The method of claim 41, wherein the test compound modulates the pathway by binding to Nrg-ICD.

43. (New) The method of claim 41, wherein the test compound modulates the pathway by inhibiting the binding of Nrg-ICD to a binding site on Eos.

44. (New) The method of claim of claim 41, wherein the test compound modulates translocation of Nrg-ICD into the nucleus of the cell.

45. (New) The method of claim 44, wherein the Nrg-ICD is produced transgenically within the cell and the Nrg-ICD further comprises a conjugate of a polypeptide that is at least 90% homologous with SEQ ID NO. 1 and a detectable label.

46. (New) The method of claim 45, wherein the Nrg-ICD further comprises a nuclear localization sequence selected from the group consisting of SEQ ID NO. 3 and SEQ ID. NO. 4.

47. (New) The method of claim 46, wherein the detectable label is selected from the group consisting of green fluorescent protein, a chemilumiphore, an antigenic peptide sequence and a regulatory marker.

48. (New) The method of claim 47, wherein the cell is a neuron.

49. (New) The method of claim 44, wherein the Nrg-ICD further comprises a nuclear localization sequence comprising SEQ ID NO. 2.

50. The method of claim 49, wherein the detectable label is a regulatory marker selected from the group consisting of a promoter and an enhancer.

51. (New) The method of claim 50, wherein the cell is a neuron.

52. (New) A method for identifying a compound that modulates proteolysis of Nrg-1 to form Nrg-ICD, the method comprising:
    (a) incubating a cellular membrane form of Nrg-1 in the presence of the compound; and
    (b) detecting the formation of a carboxylic end portion of Nrg-1 that is less than approximately 60 kilodaltons in size.

53. (New) The method of claim 52, wherein the cellular form of Nrg-1 is an intact cell and the carboxylic end portion of Nrg-1 is approximately 35 kilodaltons in size.

54. (New) The method of claim 52, wherein the carboxylic end portion is detected by an immunologically reactive water soluble peptide.